National Aeronautics
and Space Administration

July 25, 1996

AO 96-OSS-01

Announcement of Opportunity

MARS PATHFINDER AND MARS'96 LANDER SCIENCE OPPORTUNITIES

Mars Pathfinder Participating Scientist Program

Mars Pathfinder Atmospheric Structure Instrument/Meteorology Package Facility Instrument Science Team

Mars'96 Mars Oxidation Experiment Facility Instrument Science Team

Notices of Intent Due: September 2, 1996 **Proposals Due: October 25, 1996**

OMB Approval No. 2700-0085

MARS PATHFINDER
AND
MARS'96 LANDER
SCIENCE OPPORTUNITIES

Announcement of Opportunity
Soliciting Proposals for
Basic Research in Space Science

AO 96-OSS-01
Issued: July 25, 1996
Letters of Intent Due: September 2, 1996
Proposals Due: October 25, 1996

Office of Space Science
National Aeronautics and Space Administration
Washington, DC 20546-0001

SUMMARY OF KEY INFORMATION

Mars Pathfinder and Mars'96 will be launched late in 1996 and participation is sought to increase the scientific yield from these missions. The objective of the Mars Pathfinder Participating Scientist program is to enhance the science return from the mission by broadening the participation and augmenting the science team to include investigations not now represented. The functions of the Mars Pathfinder Atmospheric Structure Instrument/Meteorology Package Facility Instrument Science Team and Mars'96 Mars Oxidation Experiment Facility Instrument Science Team are to optimize the operation and data return from these facility instruments, to do initial scientific analysis of the data in support of the mission, and to produce and place properly calibrated and referenced data sets into the Planetary Data System (PDS) for use by the entire scientific community.

Planned Schedule of Investigation Proposal and Selection Events

September 2, 1996	Notices of Intent due
October 25, 1996	Proposals due
December 1996	Selection of investigations: - Mars Pathfinder Participating Scientist Program - Mars Pathfinder Atmospheric Structure Instrument/Meteorology Package Facility Instrument Science Team - Mars'96 Mars Oxidation Experiment Facility Instrument Science Team

MARS PATHFINDER AND MARS'96 LANDER SCIENCE OPPORTUNITIES

Mars Pathfinder Participating Scientist Program
and
Mars Pathfinder Atmospheric Structure Instrument/Meteorology Package (ASI/MET) Facility Instrument Science Team
and
Mars'96 Mars Oxidation Experiment (MOx) Facility Instrument Science Team

This NASA Announcement of Opportunity (AO) solicits proposals for research on Mars missions with individual investigators participating as:

1) Participating Scientists – to conduct instrument and mission related scientific investigations during mission operations of the Mars Pathfinder mission from just after launch, January 1997, through the end of the nominal mission in August 1998.

2) Facility Instrument Science Team (FIST) members

(a) to conduct instrument investigations that optimize operations and science return from the ASI/MET instrument on the Mars Pathfinder spacecraft from just after launch in January 1997 through the nominal mission in August 1998, to do initial scientific analysis of the data in support of the mission and to produce and place properly calibrated and referenced data into the Planetary Data System (PDS) for use by the entire scientific community.

(b) to conduct instrument investigations that maximize science return from the U.S. MOx instrument on the Russian Mars'96 Small Stations beginning just after launch in November 1996 for a minimum of 80 days, to do initial scientific analysis of the data in support of the mission, and to produce and place properly calibrated and referenced data sets into the PDS for use by the entire scientific community.

The objectives of the Participating Scientist program are to enhance the science data return from Mars Pathfinder by broadening participation in the mission, to augment the science team to include investigations not now represented, and to maximize the contribution of Mars Pathfinder to the future exploration and scientific understanding of Mars. The objectives of the FIST programs are to competitively select science team members of balanced scientific and technical expertise to maximize operation and information from these facility instruments.

Participation in these programs is open to individuals in all categories of organizations: industry, educational institutions and other nonprofit organizations, NASA and other U.S. Government agencies, and foreign organizations. Letters of intent to propose are due September 2, 1996. Proposals may be submitted anytime on or before October 25, 1996. Proposals will be evaluated by scientific peer review.

Selection will be announced in December 1996, and funds will be awarded early in 1997. This AO is intended for individual scientists not currently selected as PI's (Principal Investigators), Co-I's (Co-Investigators), or IDS's (Interdisciplinary Scientists) for the respective missions.

Detailed information for preparing a proposal in response to this Announcement of Opportunity is included in the following appendices. Appendix A provides technical and program information in the general area in which proposals are sought, and also includes information about the Mars Pathfinder and Mars'96 missions, the nature of the investigations being flown, and the procedures and criteria for selection. Appendix B provides general instructions and provisions relevant to submitting a proposal. Appendix C provides guidelines for preparing a proposal in response to an Announcement of Opportunity, and Appendix D contains sample forms and certifications required for proposal submission. Furthermore, two Proposal Information Packages (PIP), for Mars Pathfinder and Mars'96, are available that contain detailed information about the respective mission, each Facility Instrument, the rest of the payload, and a list of current Mars Pathfinder and Mars'96 investigators. Each PIP is available electronically via the World Wide Web, after July 25, 1996, and can be accessed through the solar system exploration home page at: http://www.hq.nasa.gov/office/solar_system/. Upon request, paper copies are also available from Jorge Scientific (address below).

Identifier:	AO 96-OSS-01
Submit Proposals and Letters of Intent to:	MARS PATHFINDER AND MARS'96 LANDER SCIENCE OPPORTUNITIES Jorge Scientific 400 Virginia Ave., S.W., Suite 700 Washington, D.C. 20024 hlancast@leda.hq.nasa.gov phone 202-554-2775
Letters of Intent Due:	September 2, 1996
Proposal Due Date:	October 25, 1996
Number of Copies Required:	20 (including signed original)
Selecting Official:	Associate Administrator for Space Science NASA Headquarters

Obtain Additional Information from:

for Mars Pathfinder

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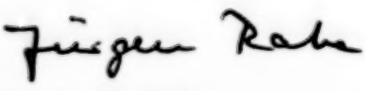
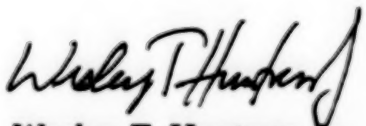
Broad based participation in Mars Pathfinder and Mars'96 will enable significant progress in our understanding of Mars. Your participation is invited to contribute to this research endeavor.



Jurgen H. Rahe
Science Program Director
Solar System Exploration
Office of Space Science



Wesley T. Huntress, Jr.
Associate Administrator
for Space Science

List of Appendices

This entire document and the Proposal Information Package are available electronically via the World Wide Web and can be accessed through the solar system exploration home page at: http://www.hq.nasa.gov/office/solar_system/.

Appendix A: Description of the Opportunity

Appendix B: General Instructions and Provisions

Appendix C: Guidelines for Proposal Submission

Appendix D: Format and Certification Forms

MARS PATHFINDER AND MARS'96 LANDER SCIENCE OPPORTUNITIES

Mars Pathfinder Participating Scientist Program
and
Mars Pathfinder Atmospheric Structure Instrument/Meteorology Package Facility Instrument Science Team
and
Mars'96 Mars Oxidation Experiment Facility Instrument Science Team

I. PROGRAM OBJECTIVES AND SCOPE

A. Mars Pathfinder Participating Scientist

1. Purpose of Participating Scientists

Participating Scientists (PS's) will be selected for the Mars Pathfinder mission in order to increase the scientific yield from the mission. In particular, the addition of PS's through this AO will allow expansion of existing science teams as they enter the active period of mission operations, data collection, analysis and archiving; to allow the addition of scientists to direct new investigations not represented by the existing science teams; and to allow the addition of scientists performing interdisciplinary investigations using one or more instruments and the rover.

Participating Scientists will be added to the teams at about the time of launch (December 1996). Funding for this program will come from the Mission Operations and Data Analysis (MO&DA) phase of the Mars Pathfinder mission, which begins at launch plus 30 days (likely January 1997), goes through the primary mission (July 4, 1997, through August 3, 1997) and the nominal mission (August 4, 1997, through August 3, 1998). A total of about $1.3 million is available for this entire period for the PS and ASI/MET FIST (described in section I.B.) programs. About $600,000 is available in Fiscal Year (FY) 1997 and $700,000 is available in FY 1998. We anticipate selecting about 20 scientists (PS and ASI/MET FIST) for Mars Pathfinder.

2. Participating Scientists' Responsibilities

Each selected Participating Scientist will participate in mission operations, which will be conducted at the Jet Propulsion Laboratory (in general, no off site operation provisions will be made during the mission). All PS will be assigned to instrument teams and specific Science Operations Groups centered around the scientific investigations afforded by the Mars Pathfinder instruments, engineering sensors, and spacecraft subsystems. These Science Operations Groups will form after selection of PS's and FIST members and will form an integral part of the mission operations team. Section II.B lists the instruments and Principal Investigators, and II.C lists potential Science Operations Working Groups. Science Operations Groups will work closely with all instrument, engineering and rover teams to plan and carry out scientific investigations using any part of the Mars Pathfinder spacecraft. This structure will ensure that all selected PS's can obtain the measurements and

data necessary for carrying out their investigations. There is no distinction between PS's that propose to use data from one instrument compared with those that propose to use data from a variety of instruments.

All PS's must contribute to activities involving the planning, collection, reduction, evaluation, and archiving of data. After formation of the Science Operations Groups most PS's will be given responsibility for producing and archiving particular data products relevant to their investigations.

B. Mars Pathfinder Atmospheric Structure Instrument/Meteorology Package (ASI/MET) Facility Instrument Science Team

1. Purpose of Facility Instrument Science Team

Scientists will be selected to be members of the Mars Pathfinder ASI/MET Facility Instrument Science Team (FIST) to plan operations of the instrument, and to analyze, calibrate, and archive data to be gathered from this scientific instrument. This Announcement permits competitive selection of scientists for this facility instrument. The design of the ASI/MET was overseen by a science advisory team (SAT), which will be disbanded at the release of this AO. We anticipate that about five scientists will form the ASI/MET FIST. The FIST will be selected near the time of launch as discussed in section I.A.1.

After selection of an ASI/MET FIST, appointment of a Team Leader will be by FIST member election with concurrence by the Project and Program Scientist. As a result, ASI/MET FIST proposals need not mention the desire of the proposer to be the Team Leader. The FIST Leader will be appointed a member of the Mars Pathfinder Project Science Group.

2. Facility Instrument Scientists' (FIS's) Responsibilities

ASI/MET FIS's will form a team with responsibility for planning and operating the instrument and analyzing and archiving data obtained from the ASI/MET instrument. Mars Pathfinder mission operations will be conducted at the Jet Propulsion Laboratory (in general, no off site operation provisions will be made during the mission). In addition, scientists proposing to investigate atmospheric structure from entry and descent data will be responsible for (with commensurably greater funding) reducing the accelerometer data from the upper atmosphere (120-80 km altitude) using tracking data provided by the Project to derive a first order estimate of atmospheric density with altitude. This will be required by September 1, 1997, for use by the Mars Global Surveyor Project during aerobraking (beginning in late September 1997).

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C. Mars'96 Mars Oxidation Experiment Facility Instrument Science Team

1. Purpose of Facility Instrument Science Team

Facility Instrument Scientists (FIS) will be selected for the Mars Oxidation Experiment (MOx) to increase the scientific information derived from operations and data analysis. The addition of the FIS's to the program through this Announcement will permit competitive selection of scientific endeavors and achieve a balance of scientific and technical expertise that will make the best use of information from this Mars'96 facility instrument.

The Facility Instrument Science Team (FIST) will be composed of the competitively selected members supported for two years beginning with Fiscal Year 1997 funds totaling approximately $800,000. It is anticipated that about 8 scientists will be selected to participate, beginning a few months after the time of launch (November 1996). After selection of the MOx FIST, appointment of a Team Leader will be by FIST member election with concurrence by the Project Manager and Program Scientist. As a result, MOx FIST proposals need not mention the desire of the proposer to be the Team Leader. The Team Leader will be the primary interface of the FIST with the Mars'96 Project.

2. Facility Instrument Scientists' Responsibilities

Each selected FIST member will participate as a member of the investigation team, in coordination with the Interdisciplinary Scientists (IDS's) who have already been selected to participate in the Mars'96 mission. As team members, the FIST members must contribute to the team activities involving collection, reduction, calibration, validation, evaluation, and archiving of data. Furthermore, the FIST investigators will carry out the independent scientific investigation that they proposed.

D. General Rules for Data Rights, Use, and Publication

The following general rules apply to data rights, use, and publication of Pathfinder and MOx data: 1) there is no proprietary period for any data collected by the spacecraft or instrument; 2) much of the data will be released early in the form of Public Information Office releases and World Wide Web postings; 3) science instrument data are subject to a validation period of six months or less from the time of acquisition to allow proper calibration, formatting, and archiving at which time they will be deposited in the Planetary Data System (PDS), and be available to the entire scientific community; 4) release and publication of science data during the validation period will be subject to the approval of the science instrument PI or FIST Leader; 5) data deposited with the PDS will contain the appropriate calibration information and ancillary data which will be updated throughout the period of investigation; and 6) it is expected that all investigators will publish their results in a timely manner in the open scientific literature.

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All PS's and FIST's will be bound by established Project and team policies involving data rights, data use, and publication of data, including the general rules detailed above.

Conflicts and problems involving the provision and use of data will be resolved by the Project Science Group and Project Scientist (for Pathfinder) or by the FIST (for MOx), or if necessary, by the respective Program Scientist.

II. THE MARS PATHFINDER AND MARS'96 LANDER MISSIONS

A. Mars Pathfinder Mission Description and Science Investigations

Mars Pathfinder will land a single vehicle carrying a rover and science instruments on the surface on Mars on July 4, 1997. The spacecraft is a single free-flyer aerocraft consisting of a tetrahedral shaped lander, packaged within an aeroshell and backshell with a back-pack-style cruise stage. The spacecraft will be launched on a Delta expendable launch vehicle in December 1996. A PAM-D upper stage will insert the spacecraft into a Type I transfer trajectory. During cruise no science activities are planned (all instruments are enclosed within the lander). The spin-stabilized spacecraft jettisons the cruise stage and enters the atmosphere directly behind an aeroshell. A parachute exposes the lander (aeroshell is ejected) and slows the vehicle. The lander drops beneath the backcover on a tether. A radar altimeter triggers the firing of three small solid tractor rockets on the backcover and inflates a series of airbags. The tether is cut and the lander bounces a number of times before coming to rest. The airbags are deflated and retracted, the triangular petals open righting the lander, and the rover drives off to explore the landing area. Pathfinder will land at the mouth of a giant catastrophic outflow channel, Ares Vallis (19.5°N, 32.8°W), where it debouches into Chryse Planitia; a wide variety of rock types may be available for study at this location. The lander's primary mission is for one month, with an nominal mission of an additional year. The rover's primary mission is for one week, with a nominal mission of one month.

The variety of scientific objectives and investigations that can be addressed by the payload described in the next section include (but are not necessarily limited to):

> Surface morphology and geology at meter and submeter scale, including what geologic processes shaped the surface, any surface-atmosphere interactions over time, near-surface stratigraphy, and soil mechanics and properties.
>
> Mineralogy and elemental composition of rocks, soil, and surface materials, including crustal composition and surface alteration and weathering products. Magnetic properties and the geochemistry and mineralogy of dust can also be investigated.

Atmospheric science investigations include: atmospheric structure (pressure, temperature, and density) with altitude; diurnal and seasonal meteorology variations of the boundary layer (pressure, temperature, wind and opacity); aerodynamic roughness; aerosol particle size and shape, and their distribution with altitude; and water vapor abundance.

Rotational and orbital dynamics by tracking the spacecraft on the surface of Mars to understand the precession constant, moment of inertia (interior structure), past obliquity, seasonal changes in length of day, and various other gravitational and orbital objectives.

B. Mars Pathfinder Payload

The lander carries three science instruments and a rover, with a variety of technology experiments and a large assortment of engineering sensors [all of these are described in more detail in the Proposal Information Package (PIP)].

1. Science instruments:

Imager for Mars Pathfinder (IMP)
(PI, Peter Smith, University of Arizona)
provides stereoscopic imaging with a variety of spectral and optical filters; calibration, reference and color targets; a magnetic properties experiment and wind socks.

Alpha Proton X-ray Spectrometer (APXS)
(PI, Rudi Rieder, Max Planck Institut für Chemie, Mainz)
is mounted on the rover on a deployment device capable of placing it against rocks and soils in a wide variety of orientations.

Atmospheric Structure Instrument/Meteorology Package (Facility Instrument)
(Chief Engineer, Clayton LaBaw, JPL; FIST Leader to be determined after team selection via this AO)
acquires atmospheric information during entry and descent of the lander through the atmosphere and during the landed mission. It has been implemented by JPL as a facility instrument. An abbreviated description of the ASI/MET is provided here for the ASI/MET FIST program; a more detailed description of this and other instruments and investigations is provided in the PIP.

The science objectives of the ASI/MET are to better understand the physical state and dynamics of the Martian atmosphere by determining a temperature, pressure, and density profile of the atmosphere, from about 120 km altitude to the surface, and to monitor the diurnal and seasonal meteorological variations of the surface boundary layer.

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Description of the Instrument. The accelerometer portion of the ASI is provided by the Attitude and Information Management (AIM) subsystem of the spacecraft. It consists of x-, y-, and z-axis accelerometers with several gain states provided to cover the wide dynamic range. The AIM also includes three engineering accelerometers (one mounted on the x-axis and two in the y-x plane oriented at 45 degrees to the z-axis) that are identical to the science accelerometers, whose data also are available for use by this investigation. None of the accelerometers is exactly on the center of mass of the spacecraft.

The ASI/MET hardware also includes temperature, pressure, and wind sensors. Temperature is measured by 4 thin-wire thermocouples mounted on a 1 m high meteorological mast that is deployed after landing. One is mounted in a triangular hole at the base of the lander to measure temperature of the atmosphere during descent. Three other thermocouples will measure temperature at 3 heights above the surface during the landed mission. Pressure, during descent and after landing, is measured by a Tavis magnetic reluctance diaphragm sensor, similar to that used by Viking. Six hot wire elements, distributed uniformly around the top of the mast, allow measurement of wind speed and direction.

2. *Rover*
(Rover Team Leader, Jake Matijevic, JPL).
The rover on Mars Pathfinder is a small solar-powered vehicle that operates almost entirely within the view of the lander cameras, or within a few tens of meters of the lander. The payload consists of monochrome stereo forward cameras for hazard detection and terrain imaging and a single rear color camera. Also on the rear of the vehicle is the APXS mounted on a deployment device that will place the APXS sensor head in a wide variety of orientations against both rocks and soil.

The rover will perform a number of technology experiments designed to provide information that will improve future planetary rovers, including: Terrain characterization; Basic soil mechanics and sinkage in each soil type ; Material wheel abrasion; Material adherence; Thermal characterization; UHF link effectiveness; Vehicle performance; and Dead reckoning, path reconstruction, and vision sensor performance.

These experiments are being carried out by the rover team; the rover was developed and will be operated by a team funded by Office of Space Access and Technology. However, data from these experiments are not restricted. Any science investigators may propose to use these data to improve their scientific investigation.

3. *Deep Space Transponder*
(Mission Director, Richard Cook, JPL)
In addition to the science instruments and rover, the Mars Pathfinder lander carries a copy of the Cassini-designed Deep Space Transponder (DST), capable of generating two-way X-band Doppler and range data via the Deep Space Network. These data

are available for any relevant science investigation, when it is obtained, in recognition that there is an impact on spacecraft and mission operations.

C. Mars Pathfinder Science Operations Groups

It is anticipated that the following Science Operations Groups will be formed to organize the scientists into effective topical groups during mission operations. These groups will interface with the science instrument and rover teams necessary to obtain the observations needed (each group may obtain data from more than one source). It is anticipated that the rover technology experimenters will also participate in these groups as appropriate.

Surface Morphology and Geology Science Operations Group

Petrology and Geochemistry Science Operations Group

Magnetic Properties Science Operations Group

Soil Mechanics and Properties Science Operations Group

Atmospheric Science Operations Group
- Atmospheric Structure Subgroup
- Surface Meteorology Subgroup
- Aerodynamic Roughness Subgroup
- Atmospheric Aerosols Subgroup

Rotational and Orbital Dynamics Science Operations Group

D. Mars Pathfinder Project Science Group

The Mars Pathfinder Project Science Group (PSG) provides guidance for all scientific aspects of the mission, including broad goals of the scientific investigations and long term operations plans. The PSG is chaired by the Mars Pathfinder Project Scientist, Dr. Matthew Golombek, and vice-chaired by the Mars Pathfinder Program Scientist, Joseph M. Boyce. The PSG works with the Project Manager to optimize the science return from the mission and to resolve conflicts among different science investigations and data uses. Members of the PSG include: Mr. Peter Smith (IMP PI), Dr. Rudi Rieder (APXS PI), Dr. Tom Economou (APXS U.S. Co-I), and the ASI/MET FIST Leader. Selected PS's may be appointed to the PSG at the request of the Project and NASA Headquarters to represent properly the breath of the scientific investigations on Pathfinder.

E. Proposal Information Packages (PIP)

A detailed knowledge of the mission, instruments, and investigations planned will be essential for preparing a competitive proposal. To provide this detailed information, Mars Pathfinder and Mars'96 Proposal Information Packages (PIP) are available to potential proposers. Each PIP contains detailed descriptions of the mission, the spacecraft characteristics, data sets, data management plans, the instruments, and the scope of existing investigations. Each mission PIP is available electronically via the World Wide Web after July 25, 1996, and can be accessed through the solar system exploration home page at:
http://www.hq.nasa.gov/office/solar_system/. Those who do not have access to the Internet can obtain paper copies of the PIP by writing to Jorge Scientific at the same address to which proposals are submitted.

F. The Mars'96 Small Stations

The Russian Mars'96 mission will consist of an orbiter carrying two penetrators and two landers. The spacecraft is scheduled to be launched on a Proton launch vehicle November 16, 1996, and to arrive at Mars in October 1997. Each small station is independently targeted to the Mars surface about seven days before the Phobos orbiter spacecraft begins its orbit insertion maneuver around Mars. Each station lands in a semi-hard fashion on an airbag cushion after aeroshell/parachute descent. Approximately 10 minutes after landing, the small station separates from the airbag system, dropping 30-50 cm to the Mars surface. Some 3-5 minutes later, the petals open, providing an upright configuration for the station. A petal boom will deploy the MOx sensor head, readying the MOx instrument for operation.

Each small station will also carry: Meteorology Instrument System including temperature sensors, absolute pressure sensor, a relative humidity sensor, an optical depth sensor, and an ion anemometer; Descent Phase Instrument system including an accelerometer, absolute pressure and temperature sensors; Alpha-particle Proton X-ray spectrometer deployed by a boom; Seismometer, magnetometer, and inclinometer (OPTIMIZM) deployed on a third boom; Descent phase camera; and a Panoramic camera.

G. Mars Oxidation Experiment

The Mars Oxidation Experiment was selected as the U.S. contribution to the Russian Mars '96 mission. Its two landers each will carry a MOx instrument; the nominal lander mission lifetime is one Mars year.

1. Objectives
MOx was designed to examine broad questions in Martian exobiology and geochemistry. MOx instrument deployment will expose thin-film materials to Martian soil and air to address the following specific objectives:

- Measure the rate of degradation of organics in the Martian environment over a period of 30 days.
- Determine if the reactions observed by the Viking biology experiments were caused by a soil oxidant.
- Determine the oxidative reactivity of the soil and atmosphere.
- Expose materials that are of interest to human exploration and monitor degradation of these materials.
- Test technologies and approaches that can be part of future analytical instruments.

2. Description of the MOx

The instrument uses fiber-optic technology to monitor physicochemical changes in a suite of chemically sensitive thin-film materials, some in contact with the Martian soil and others exposed only to the atmosphere. The end of an optical fiber is coated with material that acts as a chemical transducer through changes in its optical properties that result from exposure (overall reflectivity dependent on the Fresnel reflection [front-surface reflectivity] and its integrated optical thickness). Three specific sets of sensors have been constructed: the soil contact set, the atmospheric set, part of which is protected from direct UV radiation, and a fully sealed set to act as an overall standard to account for electronic and thermal drifts as well as mechanical perturbations. The coatings on each set of micromirrors are listed in the PIP.

A detailed knowledge of the MOx will be essential for preparing a competitive proposal. To provide this detailed information, a Proposal Information Package (PIP) is available to potential proposers. This PIP contains a general description of the Mars'96 mission, small stations, detailed description of the MOx, data sets, and data management plans. The PIP is available via anonymous retrieval on the internet via the World Wide Web, after July 25, 1996, and can be accessed through the solar system exploration home page at:
http://www.hq.nasa.gov/office/solar_system/. Those who do not have access to the Internet can obtain paper copies of the PIP by writing to Jorge Scientific at the same address to which proposals are submitted.

III. PROPOSAL EVALUATION, SELECTION, AND PREPARATION INFORMATION

A. Evaluation Criteria

The criteria for selection of all (Mars Pathfinder PS and FIST, and Mars'96 FIST) investigations are listed below. The following three primary criteria are considered of equal importance:

The scientific and technological merit of the proposed investigation and its contribution to the objectives of the mission and to the fundamental understanding of Mars.

The proposal's relevance to this specific opportunity, including overall balance of scientific investigations and technical expertise within the Pathfinder mission or the individual FIST's.

Reasonableness of total costs. Total costs will be considered to include not only those proposed for the scientific investigation and scientific data analysis, but also the impact of the investigation on spacecraft and mission operations costs.

Also considered, but of less importance in the proposal evaluation, are:

The competence and relevant experience of the proposer and any proposed support personnel as an indication of their ability to perform the proposed technical tasks and conduct the investigation to a successful conclusion.

The commitment of the proposer's institution, as measured by the willingness of the institution to provide the necessary support (logistics, facilities, etc.) to ensure that the investigation can be completed satisfactorily.

Factors determining the scientific and technical merit of a proposal will include the following, in no priority order:

A clear understanding of the Mars Pathfinder or Mars'96 mission, Principal Investigator Instrument and/or Facility Instrument (as appropriate) and its scientific and technical capabilities, particularly those related to the proposed investigation.

Feasibility of the proposed investigation using the instrument(s) and the data returned from them and a clear statement of the instrument data required for the proposed investigation.

The ability, capabilities, and commitment of the investigator to participate in planning, collection, reduction, evaluation and archiving of the data to be placed in the PDS in a reasonable amount of time (nominally 6 months or less). A description of the specific data products that will be produced by the investigation should also be included.

The ability of atmospheric structure FIST members to determine a Mars upper atmospheric profile for use by the Mars Global Surveyor mission within a two month period.

B. Special Conditions on Proposed Investigations

1. Proposer Eligibility.
Proposals for PS and FIST investigations requesting funding will be entertained from any scientist who is a member of the U.S. scientific community. Foreign scientists are also eligible to propose; such investigations, if selected, will be subject to established NASA procedures for such international agreements, including their implementation on a no exchange of funds basis. Details on submission of foreign proposals is provided in a later section of the AO.

2. Exclusions on Proposals.
Proposals falling into one or more of the categories listed below will be considered as nonresponsive to this AO and will be **excluded** from further evaluation.

1. Proposals for investigations from current Mars Pathfinder PI's and Co-I's and Mars'96 IDS's. These individuals are not eligible to propose because they can carry out investigations within the scope of their originally accepted proposals (or by appropriate modifications).

2. Proposals involving the provision of hardware or the modification of existing hardware. Both spacecraft and/or instruments are completely built and no additional modifications will be considered.

3. Proposals involving only the use of data. It is intended that all PS's and FIST members will be functioning members of the investigation team and will have specific responsibilities involving mission operations, data collection and preparation of the data for archival in the PDS. Individuals seeking only data will be able to obtain them subsequently from the PDS.

3. Funding Levels and Budget Items.
PS and FIST investigations are to be proposed by **individual scientists** from their respective institutions (proposals involving groups of scientists will only consider one person as a team member). Proposed budgets should include only major items such as proposer's salary, necessary supplies, travel, publication costs, etc. A limited number of subordinate individuals, particularly students, may be considered if their inclusion is appropriate to the investigation. No major hardware items, such as workstations, will be provided.

Proposals should specify periods of performance extending from January 1997 through the end of the nominal mission. All proposals must include separate budgets for each year. Awards will be made annually upon receipt and acceptance of a brief progress report.

C. Evaluation and Selection Procedures

A scientific peer review will be conducted by NASA of all proposals submitted in response to this AO.

1. *Evaluation Process*
Proposals received in response to this AO which request financial support from NASA will be evaluated in accordance with the provisions of NASA Handbook NHB 8030.6B (Guidelines for Acquisition of Investigations). All proposals will be subjected to a preliminary screening to determine their suitability and responsiveness to the AO. Proposals which are not responsive to the intent of the AO will be handled as correspondence. Those proposals which are responsive to the AO will be assessed by panels composed of reviewers who are scientific and technical peers of the proposers. The purpose of this peer review will be to determine the scientific and technical merit of each proposal, expressed in terms of its strengths and weaknesses.

2. *Categorization Process*
After these evaluations, a Categorization Subcommittee, consisting of U.S. civil servants, will consider the totality of all evaluations, including additional information regarding program balance and overall funding, in order to categorize the proposals according to the following definitions:

> Category I: Well-conceived and scientifically and technically sound investigations pertinent to the goals of the program and the Announcement's objectives and offered by a competent investigator from an institution capable of supplying the necessary support to ensure that the investigation can be delivered on time and within budget.
>
> Category II: Well-conceived and scientifically and technically sound investigations which are recommended for acceptance, but at a lower priority than Category I.
>
> Category III: Scientifically and technically sound investigations which require further development. (does not apply to this AO)
>
> Category IV: Proposed investigations which are recommended for rejection for this particular opportunity, for scientific, technical, cost, or other reasons.

3. *Selection Process*
Following the evaluations described above, the NASA Program Office (Research Program Management Division) will develop a selection recommendation. This recommendation and all the peer review and categorization materials on all proposals may be submitted to the Space Science Steering Committee for review. Selection of investigations will be made by the Science Program Director, Solar System Exploration, Office of Space Science (NASA) and announced in December

1996. Funds for the investigations will be awarded in January-February 1997, when the MO&DA mission phase begins.

D. Proposal Guidelines

General provisions and information that must be provided with each proposal is described in Appendix B "General Instructions and Provisions" and Appendix C, "Guidelines for Proposal Preparation." In addition, the material immediately below supplements the requirements given in Appendices B and C, by providing additional details on the required format and contents for all proposals submitted in response to this AO.

1. Letters of Intent

Letters of intent to propose are due to Jorge Scientific by September 2, 1996. The letter should indicate whether a PS or FIST proposal is being prepared, the title of the proposal, a list of participants, and a short description of the investigation. This information will help the Program Office plan for the efficient receipt, management, and review of proposals. Providing this information does not imply any commitment to submit a proposal.

2. Proposal Format and Content

The format and content of the proposal are described in Appendix C and amended by the following.

Each proposal must include the following initial standard pages (examples are included in Appendix D): 1) a cover sheet containing the proposal title, the specific program being proposed to; the proposer's name, address, telephone and fax numbers, e-mail address, and institutional affiliation, and essential signatures; 2) names and addresses of other essential personnel; 3) an proposal summary providing a brief (few hundred words) description of the proposed investigation; 4) a summary budget page and a budget page for each year.

These standard pages should be followed by a concise description of the proposed investigation, not to exceed 10 single-spaced typewritten pages in length in type no smaller than 12 point. This statement should specifically include the following information:

1. a description of the proposed investigation, its scientific justification, and the methods by which it will be carried out;

2. specific and clear identification of the detailed data types needed to carry out the investigation;

3. a justification of the proposed role as a PS or FIST member during the mission operations phase of the mission, including in which operations roles the investigator will participate, what data products will be produced and archived, and

why the proposed investigation cannot be carried out simply through postmission access to the data;

4. existing facilities that are available to support the proposed research (no hardware acquisition will be allowed);

Not included in the page count but needed to complete the proposal are:

1. a detailed budget for each year of the investigation for which funding is requested (e.g. Appendix D) and a justification for the proposed budget;

2. a vita, including publications list;

3. a list of the investigator's current and pending support;

4. and institutional certifications.

Twenty copies (including signed original) of each proposal should be sent to:

MARS PATHFINDER AND MARS'96 LANDER SCIENCE OPPORTUNITIES
Jorge Scientific
400 Virginia Ave., S.W., Suite 700
Washington, D.C. 20024
phone 202-554-2775

At least one copy of the proposal must carry the original signatures of the proposer and institutional official authorized to commit the institution to the proposed investigation. **All copies of the proposal must arrive by 4:00 P.M., October 25, 1996.** Faxed or e-mailed proposals are not acceptable.

E. Special Guidelines and Instructions for non-U.S. Proposers

Proposals from non-U.S. entities should not include a cost plan. Non-U.S. proposals and U.S. proposals which include non-U.S. participation must be endorsed by the respective government agency or funding/sponsoring institution in that country from which the non-U.S. participation is proposing. Such endorsement should indicate:

1. The proposal merits careful consideration by NASA; and

2. If the proposal is selected, sufficient funds will be made available to undertake the activity proposed.

Proposals, along with the requested number of copies and Letters of Endorsement, must be forwarded to NASA in time to arrive before the deadline established for this AO. One copy of these documents should be sent to:

Ms. Shiron D. Gaines
Re: AO 96-OSS-01 / Mars Pathfinder, Mars'96
International Relations Division
Code IRD
NASA Headquarters
Washington, DC 20546-0001
USA

All proposals must be typewritten in English. All non-U.S. proposals will undergo the same evaluation and selection process as those originating in the U.S. Non-U.S. proposals and U.S. proposals which include foreign participation must follow all other guidelines and requirements described in this AO.

All proposals must be received before the established closing date; those received after the closing date will be treated in accordance with NASA's provisions for late proposals. Sponsoring non-U.S. agencies may, in exceptional situations, forward a proposal without endorsement to the above address, if review and endorsement is not possible before the announced closing date. In such cases, however, NASA's International Relations Division should be advised when a decision on endorsement can be expected.

Successful and unsuccessful proposers will be contacted directly by the NASA Program Office coordinating the AO. Copies of these letters will be sent to the sponsoring agency.

Should a non-U.S. proposal be selected, NASA's International Relations Division will arrange with the non-U.S. sponsoring agency for the proposed participation on a no-exchange-of-funds basis, in which NASA and the non-U.S. sponsoring agency will each bear the cost of discharging its respective responsibilities. Depending on the nature and extent of the proposed cooperation, these arrangements may entail:

1. A letter of notification by NASA; and/or

2. An exchange of letters between NASA and the sponsoring governmental agency

F. Sources for Additional Information

For more information concerning this AO, contact:

for Mars Pathfinder

Mr. Joseph Boyce
Code SR
Office of Space Science
NASA Headquarters
Washington, D.C. 20546
phone: (202) 358-0302
fax: (202) 358-3097
email: jboyce@hq.nasa.gov

for MOx

Dr. Michael Meyer
Code SR
Office of Space Science
NASA Headquarters
Washington, D.C. 20546
(202) 358-0307
(202) 358-3097
mmeyer@hq.nasa.gov

Appendix B: General Instructions and Provisions

I. Instrumentation and/or Ground Equipment

By submitting a proposal, the investigator and institution agree that NASA has the option to accept all or part of the offeror's plan to provide the instrumentation or ground support equipment required for the investigation or NASA may furnish or obtain such instrumentation or equipment from any other source as determined by the selecting official. In addition, NASA reserves the right to require use, by the selected investigator, of Government instrumentation or property that becomes available, with or without modification, that will meet the investigative objectives.

II. Tentative Selections, Phased Development, Partial Selections, and Participation with Others

By submitting a proposal, the investigator and the organization agree that NASA has the option to make a tentative selection pending a successful feasibility or definition effort. NASA has the option to contract in phases for a proposed experiment, and to discontinue the investigative effort at the completion of any phase. The investigator should also understand that NASA may desire to select only a portion of the proposed investigation and/or that NASA may desire the individual's participation with other investigators in a joint investigation, in which case the investigator will be given the opportunity to accept or decline such partial acceptance or participation with other investigators prior to a selection. Where participation with other investigators as a team is agreed to, one of the team members will normally be designated as its team leader or contact point.

III. Selection Without Discussion

The Government reserves the right to reject any or all proposals received in response to this AO when such action shall be considered in the best interest of the Government. Notice is also given of the possibility that any selection may be made without discussion (other than discussions conducted for the purpose of minor clarification). It is therefore emphasized that all proposals should be submitted initially on the most favorable terms that the offeror can submit.

IV. Foreign Proposals

See Appendix C, Section II, para. 3.

V. Treatment of Proposal Data

It is NASA policy to use information contained in proposals and quotations for evaluation purposes only. While this policy does not require that the proposal or quotation bear a restrictive notice, offerors or quoters should place the following notice on the title page of the proposal or quotation and specify the information, subject to the notice by inserting appropriate identification, such as page numbers, in the notice. Information (data) contained in proposals and quotations will be protected to the extent permitted by law, but NASA assumes no liability for use and disclosure of information not made subject to the notice.

RESTRICTION ON USE AND DISCLOSURE OF PROPOSAL AND QUOTATION INFORMATION (DATA)

The information (data) contained in [insert page numbers or other identification] of this proposal or quotation constitutes a trade secret and/or information that is commercial or financial and confidential or privileged. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offeror, be used or disclosed for other than evaluation purposes; provided, however, that in the event a contract is awarded on the basis of this proposal or quotation the Government shall have the right to use and disclose this information (data) to the extent provided in the contract. This restriction does not limit the Government's right to use or disclose this information (data) if obtained from another source without restriction.

VI. Status of Cost Proposals (U.S. Proposals Only)

The investigator's institution agrees that the cost proposal is for proposal evaluation and selection purposes, and that following selection and during negotiations leading to a definitive contract, the institution will be required to resubmit or execute a Standard Form (SF) Form 1411 "Contract Pricing Proposal Cover Sheet" and certifications and representations required by law and regulation.

VII. Late Proposals

The Government reserves the right to consider proposals or modifications thereof received after the date indicated, should such action be in the interest of the Government.

VIII. Source of Space Transportation System Investigations

Investigators are advised that candidate investigations for Space Transportation System (STS) missions can come from many sources.

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IX. Disclosure of Proposals Outside Government

NASA may find it necessary to obtain proposal evaluation assistance outside the Government. Where NASA determines it is necessary to disclose a proposal outside the Government for evaluation purposes, arrangements will be made with the evaluator for appropriate handling of the proposal information. Therefore, by submitting a proposal the investigator and institution agree that NASA may have the proposal evaluated outside the Government. If the investigator or institution desire to preclude NASA from using an outside evaluation, the investigator or institution should so indicate on the cover. However, notice is given that if NASA is precluded from using outside evaluation, it may be unable to consider the proposal.

X. Equal Opportunity (U.S. Proposals Only)

By submitting a proposal, the investigator and institution agree to accept the following clause in any resulting contract:

EQUAL OPPORTUNITY

During the performance of this contract, the Contractor agrees as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.

2. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. This shall include, but not be limited to, (a) employment, (b) upgrading, (c) demotion, (d) transfer, (e) recruitment or recruitment advertising, (f) layoff or termination, (g) rates of pay or other forms of compensation, and (h) selection for training, including apprenticeship.

3. The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.

4. The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

5. The Contractor shall send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding the notice to be provided by the Contracting Officer, advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

6. The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

7. The Contractor shall furnish to the contracting agency all information required by Executive Order 11246, as amended, and by the rules, regulations, and orders of the Secretary of Labor. Standard Form 100 (EEO-1), or any successor form, is the prescribed form to be filed within 30 days following the award, unless filed within 12 months preceding the date of award.

8. The Contractor shall permit access to its books, records, and accounts by the contracting agency or the Office of Federal Contract Compliance Programs (OFCCP) for the purposes of investigation to ascertain the Contractor's compliance with the applicable rules, regulations, and orders.

9. If the OFCCP determines that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, the contract may be canceled, terminated, or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts, under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended, the rules, regulations, and orders of the Secretary of Labor, or as otherwise provided by law.

10. The Contractor shall include the terms and conditions of subparagraph 1 through 9 of this clause in every subcontract or purchase order that is not exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor.

11. The Contractor shall take such action with respect to any subcontract or purchase order as the contracting agency may direct as means of enforcing these terms and conditions, including sanctions for non-compliance; provided, that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

XI. Patent Rights

1. For any contract resulting from this solicitation awarded to other than a small business firm or nonprofit organization, the clause at NFS 1852.227-70, "New Technology," shall apply. Such contractors may, in advance of contract, request waiver of rights as set forth in the provision at NFS 1852.227-71, "Requests for Waiver of Rights to Inventions."

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2. For any contract resulting from this solicitation awarded to a small business firm or nonprofit organization, the clause at FAR 52.227-11, "Patent Rights--Retention by the Contractor (Short Form)" (as modified by NFS 1852.227-11), shall apply.

Appendix C: Guidelines for Proposal Preparation

The following guidelines apply to the preparation of proposals in response to an AO. The material is a guide for the proposer and not intended to be encompassing or directly applicable to the various types of proposals which can be submitted. The proposer should provide information relative to those items applicable or as required by the AO.

I. Cover Letter

A letter or cover page should be forwarded with the proposal signed by the investigator and an official by title of the investigator's organization who is authorized to commit the organization responsible for the proposal.

II. Table of Contents

The proposal should contain a table of contents.

III. Identifying Information

The proposal should contain a short descriptive title for the investigation, the names of all investigators, the name of the organization or institution and the full name, address, and telephone number of the Principal Investigator.

SECTION I--INVESTIGATION AND TECHNICAL PLAN

1. Investigation and Technical Plan

The investigation and technical plan generally will contain the following:

a. **Summary.** A concise statement about the investigation, its conduct, and the anticipated results.

b. **Objective and Significant Aspects.** A brief definition of the objectives, their value, and their relationships to past, current, and future effort. The history and basis for the proposal and a demonstration of the need for such an investigation. A statement of present development in the discipline field.

c. **Investigation Approach**

(1) Fully describe the concept of the investigation.

(2) Detail the method and procedures for carrying out the investigation.

2. Data Reduction and Analysis

A discussion of the data reduction and analysis plan including the method and format. A section of the plan should include a schedule for the submission of reduced data to the Planetary data System,.

SECTION II--MANAGEMENT PLAN AND COST PLAN

A. Management Plan

The management plan should summarize the management approach and the facilities and equipment required Additional guidelines applicable to non-U.S. proposers contained herein:

1. Management

a. The management plan set forth gives the approach for managing the work, the recognition of essential management functions, and the overall integration of these functions.

b. The management plan gives insight into the organization proposed for the work, including the internal operation and lines of authority with delegations, together with internal interfaces and relationships with the NASA major subcontractors and associated investigators. Likewise, the management plan usually reflects various schedules necessary for the logical and timely pursuit of the work, accompanied by a description of the investigator's work plan and the responsibilities of the support personel.

2. Facilities and Equipment

All major facilities, laboratory equipment, and ground-support equipment (GSE) (including those of the investigator's proposed contractors and those of NASA and other U.S. Government agencies) essential to the experiment in terms of its system and subsystems are to be indicated, distinguishing insofar as possible between those already in existence and those that will be developed in order to execute the investigation. The outline of new facilities and equipment should also indicate the lead time involved and the planned schedule for construction, modification, and/or acquisition of the facilities.

3. Additional Guidelines Applicable to Non-U.S Proposers Only

The following guidelines are established for foreign responses to NASA's AO. Unless otherwise indicated in a specific announcement, these guidelines indicate the appropriate measures to be taken by foreign proposers, prospective foreign sponsoring agencies, and NASA leading to the selection of a proposal and execution of appropriate arrangements. They include the following:

a. Where a "Notice of Intent" to propose is requested, prospective foreign proposers should write directly to the NASA official designated in the AO and send a copy of this letter to the International Relations Division, Office of External Relations, Code IR, NASA, Washington, DC 20546, U.S.A.

b. Unless otherwise indicated in the AO, proposals will be submitted in accordance with this Appendix excluding cost plans. Proposals should be typewritten and written in English.

c. Persons planning to submit a proposal should

arrange with an appropriate foreign governmental agency for a review and endorsement of the proposed activity. Such endorsement by a foreign organization indicates that the proposal merits careful consideration by NASA and that, if the proposal is selected, sufficient funds will be available to undertake the activity envisioned.

d. Proposals including the requested number of copies and letters of endorsement from the foreign governmental agency must be forwarded to NASA in time to arrive before the deadline established for each AO. These documents should be sent to:

Ms. Shiron Gaines
International Relations Division
Code IRD
Office of External Relations
NASA Headquarters
Washington, DC 20546-0001
U.S.A.

e. Those proposals received after the closing date will be treated in accordance with NASA's provisions for late proposals. Sponsoring foreign government agencies may, in exceptional situations, forward a proposal directly to the above address if review and endorsement is not possible before the announced closing date. In such cases, NASA should be advised when a decision on endorsement can be expected.

f. Shortly after the deadline for each AO, NASA's International Relations Division will advise the appropriate sponsoring agency which proposals have been received and when the selection process should be completed. A copy of this acknowledgement will be provided to each proposer.

g. Successful and unsuccessful proposers will be contacted directly by the NASA Program Office coordinating the AO. Copies of these letters will be sent to the sponsoring Government agency.

h. NASA's International Relations Division will then begin making the arrangements to provide for the selectee's participation in the appropriate NASA program. Depending on the nature and extent of the proposed cooperation, these arrangements may entail:

(1) A letter of notification by NASA.

(2) An exchange of letters between NASA and the sponsoring foreign governmental agency.

(3) An agreement or Memorandum of Understanding between NASA and the sponsoring foreign governmental agency.

B. COST PLAN (U.S. Investigations Only)

The cost plan should summarize the total investigation cost by major categories of cost as well as by function.

1. The categories of cost should include the following:

a. **Direct Labor**--List by labor category, with labor hours and rates for each. Provide actual salaries of all personnel and the percentage of time each individual will devote to the effort.

b. **Overhead**--Include indirect costs. Usually this is in the form of a percentage of the direct labor costs.

c. **Materials**--This should give the total cost of the bill of materials including estimated cost of each major item. Include lead time of critical items.

d. **Subcontracts**--List those over $25,000, specify the vendor and the basis for estimated costs Include any baseline or supporting studies.

e. **Special Equipment**--Include a list of special equipment with lead and/or development time.

f. **Travel**--List estimated number of trips, destinations, duration, purpose, number of travelers, and anticipated dates.

g. **Other Costs**--Costs not covered elsewhere.

h. **General and Administrative Expense**--This includes the expenses of the institution's general and executive offices and other miscellaneous expenses related to the overall business.

i. **Fee** (if applicable).

2. Separate schedules, in the above format, should be attached to show total cost allocable to the following:

a. Principal Investigator and other personnel costs.

b. Data reduction and analysis including the amount and cost of computer time.

3. If the effort is sufficiently known and defined, a funding obligation plan should provide the proposed funding requirements of the investigations by quarter and/or annum keyed to the work schedule.

Appendix D
AO 96-OSS-01

Formats for Supplementary Information Required with Submitted Proposals

- Proposal Checklist
- Cover Sheet
- Key Personnel Listing
- Proposal Summary
- Full Budget Summary
- Yearly Budget Summary
- Current and Pending Support
- Certification Forms

Check List for Proposal Mailing

Original and 19 to Jorge Scientific

Cover Sheet

Key Personnel

Proposal Summary

Budget Summary

Project Description

Personnel and Vitae

Facilities and Equipment

Budget for each year

Current and Pending Support

Certifications:

- Drug-free Workplace
- Debarment, Suspension, & Other Responsibilities
- Lobbying (if > $100,000)

Mars Pathfinder and Mars'96 Lander Science Opportunities

Log No. _____

Date Received: _____

Do not write in the shaded area.

AO #: 96 - OSS - 01

Date Submitted: _____

Please check boxes appropriate to this AO:

o **Participating Scientist** o **ASI/MET FIST** o **MOx FIST**

Type of Organization: _____
(Profit, non-profit, university, etc.)

Proposal Title: _____

Principal Investigator (Name): _____

Institution: _____

Address: _____

City/State/Zip Code: _____

Telephone: (____)_____ **Fax:** (____) _____

E-Mail Address: _____

_____ _____
Signature Date

Institutional Authorization Official:

_____ _____
Signature Date

Address: _____

City/State/Zip Code: _____

Telephone: (____)_____ **Fax:** (____) _____

Institution Contact or Business Representative:

Telephone: (____)_____ **Fax:** (____) _____

Please list all additional participants names and institutions below.

Proposed Duration of Project: _____ months

Desired Start Date: _____ **End Date:** _____

Budget Request:

Year 1	Year 2
$_____	$_____

Total Funding Requested: $_____

PROPOSAL SUMMARY

TITLE: _____

PRINCIPAL INVESTIGATOR: _____

INSTITUTION: _____

ABSTRACT

Type single-spaced within the space provided below. List:
Goals, overall objectives and justification of the work;

FULL BUDGET SUMMARY

TITLE: _____

PRINCIPAL INVESTIGATOR: _____

FULL DURATION REQUESTED: _____YRS START DATE: _____ END DATE: _____

1.	SALARIES AND WAGES	$_____
2.	SUPPLIES AND MATERIALS	$_____
3.	EQUIPMENT PURCHASES	$_____
4.	COMPUTER TIME (paid with PI funds)	$_____
5.	SERVICES	$_____
6.	PUBLICATIONS AND COMMUNICATIONS	$_____
7.	TRAVEL*	$_____
8.	OTHER (INCLUDING BENEFITS AND OVERHEAD)	$_____
9.	SUBTOTAL FULL DURATION BUDGET	$_____
10.	INSTITUTIONAL CONTRIBUTIONS	$_____
11.	TOTAL BUDGET REQUESTED FOR ALL YEARS NEW FUNDS REQUESTED FROM NASA	$_____

****

SUMMARY OF STAFFING REQUEST (NEAREST $K, NEAREST 0.1 PERSONYEAR)

1.	SENIOR PERSONNEL (GIVE NAMES)	_____ py	$_____
2.	TECHNICAL SUPPORT (GIVE NUMBER)	_____ py	$_____
3.	OTHER	_____ py	$_____
4.	TOTALS	_____ py	$_____

* Provide names of travelers, dates, and destinations for each year of support requested.

YEARLY BUDGET SUMMARY

YEAR BUDGET AND PERSONNEL SUMMARY BREAKDOWN

TITLE: _____

PRINCIPAL INVESTIGATOR & INSTITUTION: _____

SUMMARY OF FIRST YEAR PROPOSED COSTS: (nearest $K)

1.	SALARIES AND WAGES	$_____
2.	SUPPLIES AND MATERIALS	$_____
3.	EQUIPMENT PURCHASES	$_____
4.	COMPUTER TIME (paid with PI funds)	$_____
5.	SERVICES	$_____
6.	PUBLICATIONS AND COMMUNICATIONS	$_____
7.	TRAVEL*	$_____
8.	OTHER (INCLUDING BENEFITS AND OVERHEAD)	$_____
9.	SUBTOTAL FULL DURATION BUDGET	$_____
10.	INSTITUTIONAL CONTRIBUTIONS	$_____
11.	TOTAL BUDGET REQUESTED FOR ALL YEARS NEW FUNDS REQUESTED FROM NASA	$_____

****

SUMMARY OF STAFFING REQUEST (NEAREST $K, NEAREST 0.1 PERSONYEAR)

1.	SENIOR PERSONNEL (GIVE NAMES)	_____ py	$_____
2.	TECHNICAL SUPPORT (GIVE NUMBER)	_____ py	$_____
3.	OTHER	_____ py	$_____
4.	TOTALS	_____ py	$_____

* Provide names of travelers, dates, and destinations for each year of support requested.

LIST CURRENT AND PENDING RESEARCH SUPPORT FROM ALL OTHER SOURCES

This list should include all current research support from all other sources. It must include the proposed project and all other research requiring a part or portion of time of the principal investigator and other senior personnel. The number of person-months must be stated regardless of the source of the support. Please provide this information in the following form:

I. Name of Principal Investigator

A. Current Support

1. Source of Support
2. Project Title and Short Abstract
3. Award Amount
4. Period Covered by Award
5. Person-Months
6. Location where research is/will be performed

B. Pending Proposals (including renewal applications)

1. Source of Support
2. Project Title and Short Abstract
3. Award Amount
4. Period Covered by Award
5. Person-Months
6. Location where research is/will be performed

II. Other agencies to which this proposal, or parts thereof, has been submitted.

CERTIFICATION REGARDING DRUG-FREE WORKPLACE REQUIREMENTS

This certification is required by the regulations implementing the Drug-Free Workplace Act of 1988, 34 CFR Part 85, Subpart F. The regulations, published in the January 31, 1989 Federal Register, require certification by grantees, prior to award, that they will maintain a drug-free workplace. The certification set out below is a material representation of fact upon which reliance will be placed when the agency determines to award the grant. False certification or violation of the certification shall be grounds for suspension of payments, suspension or termination of grants, or government-wide suspension or debarment (see 34 CFR Part 85, Sections 85.615 and 85.620).

I. GRANTEES OTHER THAN INDIVIDUALS

A. The grantee certifies that it will provide a drug-free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;

(b) Establishing a drug-free awareness program to inform employees about –

(1) The dangers of drug abuse in the workplace;

(2) The grantees policy of maintaining a drug-free workplace;

(3) Any available drug counseling, rehabilitation, and employee assistance programs; and

(4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

(c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a);

(d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will

(1) Abide by the terms of the statement; and

(2) Notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five days after such conviction;

(e) Notifying the agency within ten days after receiving notice under subparagraph (d) (2) from an employee or otherwise receiving actual notice of such conviction;

(f) Taking one of the following actions, within 30 days of receiving notice under subparagraph (d) (2), with respect to any employee who is so convicted –

(1) Taking appropriate personnel action against such an employee, up to and including termination; or

(2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or Local health, Law enforcement, or other appropriate agency;

(g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (d), (e), and (f)

B. The grantee shall insert in the space provided below the site(s) for the performance or work done in connection with the specific grant:

Place of Performance (Street address, city, county, state, zip code)

_____

_____

_____

_____

Check ____ if there are workplaces on file that are not identified here.

II. GRANTEES WHO ARE INDIVIDUALS

The grantee certifies that, as a condition of the grant, he or she will not engage in the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance in conducting any activity with the grant.

Organization Name | AO or NRA Number and Title

Printed Name and Title of Authorized Representative

Signature | Date

Printed Principal Investigator Name | Proposal Title

CERTIFICATION REGARDING LOBBYING

As required by S 1352 Title 31 of the U.S. Code for persons entering into a grant or cooperative agreement over $100,000, the applicant certifies that:

(a) No Federal appropriated funds have been paid or will be paid by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, in connection with making of any Federal grant, the entering into of any cooperative, and the extension, continuation, renewal, amendment, or modification of any Federal grant or cooperative agreement;

(b) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting an officer or employee of any agency, Member of Congress, or an employee of a Member of Congress in connection with this Federal grant or cooperative agreement, the undersigned shall complete Standard Form - LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(c) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subgrants, contracts under grants and cooperative agreements, and subcontracts), and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by S1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Organization Name | AO or NRA Number and Title

Printed Name and Title of Authorized Representative

Signature | Date

Printed Principal Investigator Name | Proposal Title

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS PRIMARY COVERED TRANSACTIONS

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 34 CFR Part 85, Section 85.510, Participants' responsibilities. The regulations were published as Part VII of the May 28, 1988 Federal Register (pages 19160–19211). Copies of the regulations may be obtained by contacting the U.S. Department of Education, Grants and Contracts Service, 400 Maryland Avenue, S.W. (Room 3633 GSA Regional Office Building No. 3), Washington, D.C. 20202-4725, telephone (202) 732-2505.

A. The applicant certifies that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three-year period preceding this application been convicted or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or Local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State, or Local) with commission of any of the offenses enumerated in paragraph A.(b) of this certification;

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or Local) terminated for cause or default; and

B. Where the applicant is unable to certify to any of the statements in this certification, he or she shall attach an explanation to this application.

C. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lowered Tier Covered Transactions (Subgrants or Subcontracts)

(a) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principles is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any federal department of agency.

(b) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Organization Name | AO or NRA Number and Title

Printed Name and Title of Authorized Representative

Signature | Date

Printed Principal Investigator Name | Proposal Title

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- ☐ 4. Minority Business
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- ☐ 6. Nonprofit Corporation
- ☐ 7. Other Government Agency
- ☐ 8. Private Industry
- ☐ 9. Small Business

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- ☐ A. American Astronomical Society
- ☐ B. American Geophysical Union
- ☐ C. Others _____

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1. Astronomy and Astrophysics

- ☐ A. Theory and Modeling
- ☐ B. Instrumentation (Technology Dev)
- ☐ C. Laboratory Astrophysics
- ☐ D. Data Analysis (Archival)
- ☐ E. Observational Programs

2. Solar System Exploration

- ☐ A. Planetary Atmospheres and Astronomy
- ☐ B. Planetary Materials and Geochemistry
- ☐ C. Planetary Geology and Geophysics
- ☐ D. Instrument Development
- ☐ E. Origins of Solar Systems
- ☐ F. Exobiology

3. Space Physics

- ☐ A. Cosmic and Heliosphere Physics
- ☐ B. Solar Physics
- ☐ C. Magnetospheric Physics
- ☐ D. Iono-Thermo-Mesospheric Physics

4. Information Systems/Computer Science

- ☐ A. High Performance Computing and Networking
- ☐ B. Scientific Data Analysis and Visualization
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